

Fish and Wildlife Reference Service Newsletter

Number 113
Summer 1997



SENATE FISH AND GAME

EXHIBIT NO. 3

DATE 3/17/09

BILL NO. HB 382

The Effects of Mandatory Basic Hunter Education and Advanced Hunter Training on Hunter Recruitment, Satisfaction and Retention

The purpose of this study was to determine the costs and benefits of basic hunter education and advanced hunter training on hunter recruitment, retention and satisfaction. Several different methodologies were used to assess this impact, including focus groups, a regression analysis, and two telephone surveys; one of active hunters and another of U. S. youth.

Mandatory basic hunter education is supported by a strong majority of U. S. non-hunters, active hunters and youth interested in hunting. Moreover, almost three-quarters (70%) of youth who are interested in hunting do not feel that a requirement to take a hunter education course would prevent them from hunting. An analysis of 1980 data from the National Survey of Fishing, Hunting and Wildlife-Associated Recreation in 1984 by Dr. Jim Applegate of Rutgers University indicated that mandatory hunter education did not impact hunter recruitment at that time. A similar analysis conducted for this study with data from the 1980, 1985 and 1991 National Surveys of Fishing, Hunting and Wildlife-Associated Recreation indicated that the impacts of mandatory hunter education on hunter recruitment were minimal, and in the 11 - 15 year age group may actually increase recruitment.

★ However, 19% -- about 1 out of every 5 -- 13 - 20 year olds interested in hunting do feel that a requirement to take a hunter education course would prevent them from hunting.

★ Based on the updated regression analysis as well as the nationwide survey of 13 to 20 year olds, it does appear that mandatory hunter education is having a slight impact on hunter recruitment. This cost of hunter education must be weighed against other non-recruitment related benefits of hunter education, including public attitudes toward hunter education, hunter safety, the exact reasons why it is inhibiting recruitment (probably related to course promotion and availability), and the differences between youth who had taken a hunter education course and those who had not. Specifically, basic hunter education course takers used multiple weapons, hunted more frequently, and projected more future hunting participation.

In addition to weighing the costs and benefits of basic mandatory hunter education, it is important to consider the reasons behind the slight impact. Does mandatory hunter education in and of itself negatively affect recruitment? Based on this study, we believe the slight impact basic mandatory hunter education is having on hunter recruitment lies within the availability and promotional aspects of the course. As one focus group respondents stated: "You need to make it readily available if they're going to mandate that you do it. It's relatively easy to get a driver's license because it's readily available. You can't mandate something and then be restrictive in offering the availability of it." Course availability and promotion must be considered. Fifty-six percent of U. S. youths have never seen a hunter education course advertised. Agencies can no longer depend on word of mouth or just PSAs to promote basic hunter education courses. In addition to traditional media outlets, agencies should consider alternative promotional efforts as well, including the worldwide web page and hunter education video game currently being developed by the International Association of Fish and Wildlife Agencies.

Agencies should consider promoting the aspects of the course that are of highest interest to potential students -- safety, hunting techniques, handling of equipment, and hands-on work in addition to classroom learning.

The main reason most children who are not interested in hunting is because of issues surrounding the killing of animals. Agencies should continue to confront this issue. Among those U. S. youths aged 13 - 20 not interested in hunting, almost two-thirds (65%) said they were not interested in hunting because they were against killing animals or that animals have a right to live.

(continued on page 2)

The issue of mandatory advanced training is not a top-of-the mind issue when non-bowhunters and non-muzzleloader hunters are asked why they do not hunt with a bow or muzzleloader. Most non-bowhunters do not hunt with a bow because they are either not interested or they do not have the time to learn to hunt with a bow. Likewise, most non-muzzleloader hunters do not hunt with a muzzleloader either because they are not interested, they don't know how, or they don't have time to learn.

In spite of the low saliency of the possible impediment of a mandatory course, when asked directly, 13% of active hunters said a mandatory hunter education course specifically for bowhunting would prevent them from bowhunting. Fifteen percent of active hunters said a mandatory hunter education course specifically for muzzleloading would prevent them from hunting with a muzzleloader.

However, 82% of active hunters said a mandatory hunter education course specifically for bowhunting would not prevent them from hunting with a bow while 79% of active hunters said that a mandatory hunter education course specifically for muzzleloading would not prevent them from hunting with a muzzleloader.

Whereas mandatory courses for bowhunting or muzzleloading do not appear to hinder recruitment into these activities to any substantial degree, neither does a voluntary course appear to motivate non-bowhunters to bowhunt nor non-muzzleloader hunters to muzzleload hunt. Only 12% of active hunters said a voluntary hunter education course specifically for bowhunting would motivate them to hunt with a bow, and 11% of active hunters said a voluntary hunter education course specifically for muzzleloading would motivate them to hunt with a muzzleloader.

Similar to the poor penetration of advertising among youth who were interested in hunting, fewer than half (45%) of active hunters had ever seen a basic or advanced hunter education course advertised. However, unlike the youth who did not know who to call to find out more information about hunter education, most active hunters knew to contact their state fish and wildlife agency (65%), a local gun club (13%), or a sporting goods store (8%).

This cover story, by Mark Damian Duda and Kira C. Young, is based on a report listed in our Spring 1997 Newsletter: *The Effects of Mandatory Basic Hunters Education and Advanced Hunter Training on Hunter Recruitment, Satisfaction, and Retention* (MIN 809780055, 34 pp.)

NEW REPORTS

MAMMALS



1. Age-Specific Reproductive Characteristics in Fishers. Frost, H.C.; Krohn, W.B.; Wallace, C.R. J. of Mammal. Pub. 2057, Maine Agric. & Forest Exper. Sta. 1997. pp. 598-612 (15 pp.). Vol. 78, No. 2. /1 mf/. MIN 189720122

2. Ecology of Wolves in Relation to a Migratory Caribou Herd in Northwest Alaska. Ballard, W.B.; Ayres, L.A.; Krausman, P.R.; Reed, D.J.; Fancy, S.G. Wildl. Soc. Mono. No. 135. 1997. 54 pp. /1 mf/. MIN 509720123

3. Wild Ungulate Depredation on Winter Wheat: Effects on Grain Yield. Austin, D.D.; Urness, P.J. Noble Foundation. In: 12th Great Plains Wildl. Damage Control Workshop Proc. R.E. Masters and J.G. Higgins (Eds.). 1993(?). pp. 51-55 (5 pp.). /1 mf/. MIN 439720114

4. Mammals Research. Pronghorn Research: Pronghorn Winter Wheat Damage Study. Strohmeyer, D.C.; White, G.C.; Gill, R.B. CO Div. of Wildl. Final Report. 1996. 28 pp. /1 mf/. MIN 059780079

5. Indiana Bat Summer Habitat Patterns in Missouri. Clawson, R.L. MO Dept. of Conserv. Final Report. 1996. 16 pp. /1 mf/. MIN 249780080

6. White-tailed Deer Population Measurement and Harvest Analysis: Evaluation of Forward Looking Infrared (FLIR) Imaging for Determining Characteristics of White-tailed Deer Populations.

Hansen, L.P.; Beringer, J. MO Dept. of Conserv. Final Report. 1996. 13 pp. /1 mf/. MIN 249780081

7. Role of Refuges in the Dynamics of Outlying Deer Populations: Two Examples from the Agricultural Midwest. Hansen, L.P.; Nixon, C.M.; Beringer, J. Smithsonian Inst. Press. Chapter 20. In: The Science of Overabundance: Deer Ecology and Population Management. W.J. McShea, H.B. Underwood and J.H. Rappole (Eds.). 1997. pp. 327-345 (22 pp.). /1 mf/. MIN 809720142

8. Relationships Among Prey Abundance, Habitat, and American Marten in Northern Maine. Lachowski, H.J. M.S. Thesis. Univ. of Maine. 1997. 88 pp. /1 mf/. MIN 189730044

9. Seed Predation by Small Mammals on Three Species of Trees in an Oak-Pine Forest Ecosystem. McCracken, K.E. Ph.D. Dissert. Univ. of Maine. 1996. 114 pp. /2 mf/. MIN 189730045

10. Ecological Relationships Among Bobcats, Coyotes, and Gray Foxes in Central Mississippi. Edwards, D.A. M.S. Thesis. MS State Univ. 1996. 206 pp. /3 mf/. MIN 239730046

11. Bobcat, Coyote, and Gray Fox Micro-Habitat Use and Interspecies Relationships in a Managed Forest in Central Mississippi. Lovell, C.D. M.S. Thesis. MS State Univ. 1996. 184 pp. /2 mf/. MIN 239730047

12. History, Status and Habitat Components of Black Bears in Mississippi. Shropshire, C.C. M.S. Thesis. MS State Univ. 1996. 316 pp. /4 mf/. MIN 239730048

- aele, A., Donnelly, M., & Vaske, J. (1986). Crowding and specialization: A nation of the crowding model. In R. Lucas (Compiler), *Proceedings of the wilderness research conference: Current research* (General Technical INT-212), pp. 333-338. Ogden, UT: USDA Forest Service, Intermountain Station.
- Opkin, T., & Moore, R. (1994). The relationship of recreation specialization and setting preferences of mountain bicyclists. In G. Vander Stoep (Ed.), *Findings of the 1994 Northeastern Recreation Research Symposium*. (General Technical Report NE-198), pp. 71-75. Radnor, PA: USDA Forest Service, Northeastern Experiment Station.
- Janfred, M., & Larson, R. (1993). Managing for wildlife viewing recreation: An application in Colorado. *Wildlife Society Bulletin*, 21, 226-236.
- McFarlane, B. (1994). Specialization and motivations of birdwatchers. *Wildlife Bulletin*, 22, 361-370.
- McIntyre, N. (1989). The personal meaning of participation: Enduring involvement. *Journal of Leisure Research*, 21(2), 167-179.
- McIntyre, N., & Pigram, J. (1992). Recreation specialization reexamined: The vehicle-based campers. *Leisure Sciences*, 14 (1), 3-15.
- Schreyer, R., & Beaulieu, J. (1986). Attribute preferences for wildland recreation settings. *Journal of Leisure Research*, 18(4), 231-247.
- Viriden, R., & Schreyer, R. (1988). Recreation specialization as an indicator of recreational preference. *Environment and Behavior*, 20(6), 721-739.
- Wellman, D., Roggenbuck, J., & Smith, A. (1982). Recreation specialization, norms of deprecative behavior among canoeists. *Journal of Leisure Research*, 14, 323-340.
- Williams, D., & Huffman, M. (1986). Recreation specialization as a factor in county trail choice. In R. Lucas (Compiler), *Proceedings of the national wilderness research conference: Current research* (General Technical Report INT-212), pp. 339-344. Ogden, UT: USDA Forest Service, Intermountain Research Station.

The Effects of Hunter-Education Requirements on Hunting Participation and Recruitment in the United States¹

Thomas A. Heberlein

Department of Rural Sociology
University of Wisconsin-Madison

Elizabeth Thomson

Department of Sociology
University of Wisconsin-Madison

Abstract: The effects of required hunter-education programs on hunter recruitment and participation were examined using the 1980, 1985, and 1990 screener surveys from the U.S. National Surveys of Fishing, Hunting and Wildlife-Associated Recreation. Information provided by states on their requirements for hunter education allowed us to determine whether people were required to take an education course before they could purchase a hunting license. We estimated the effect of hunter-education requirements on hunting participation, controlling for the person's age, sex, and race/ethnicity, as well as for the percentage of hunting population living in rural areas and the regional level of hunting participation in 1955 (as a surrogate for hunting culture). In 1980, 23 states with no hunter-education requirement had an overall hunting participation rate of 12%, while participation in states with a hunter-education requirement for all hunters was 6%. States with requirements were, however, more urban and had lower participation rates in 1955. When the individual and state-level factors associated with hunter participation are controlled statistically, the difference in participation was less than 1% ($p < .01$) for persons required or not required to take a hunter-education course. Hunter education also reduces first-time hunting rates for persons age 16 and older. Individual-level measures of residence and hunting culture, where they are available, might further reduce estimated effects on hunter-education requirements. Estimates of hunter-education effects on hunting are for national-level data and may not apply to particular states' hunter-education programs.

Keywords: Hunting, hunting participation, hunter education, hunting culture

Biological and social factors affect hunting participation in the United States. When game populations increase or decline, hunter participation generally follows. Social factors play a role, too. Our past research has shown, for example, that increasing urbanization and education reduce hunting participation (Heberlein, 1987; Heberlein & Thomson, 1991, 1995). While wildlife managers can do little to modify such broad social trends, other social factors, such as the cost or requirements for obtaining a hunting license, are more controllable. This study uses data from U.S. National Surveys of Fishing, Hunting, and Wildlife-Associated Recreation to examine the role of hunter-education requirements in hunter participation and recruitment in the United States.

Hunter-education requirements began in New York in 1949 when all first-time hunters were required to have hunter training. California was the next state to require training of first-time hunters in 1954. By 1995, all but two states, Massachusetts and Alaska, had a requirement for at least some first-time hunters. Because these programs were initiated by states rather than the federal government, they have differing characteristics. Generally, people holding hunting licenses at the time the requirement was initiated were exempt from hunter education. But states vary widely in type of requirement, testing, and degree of training, and requirements often apply at first only to young people. For example, Wisconsin initiated a requirement in 1985, but it applied only to persons born after 1972. Thus, even where hunter education is "required" as in Wisconsin, the requirement applied to only 11% of persons age 11 or older in 1990. One reason for this "grandfathering" has been to make hunter-education requirements more palatable to current hunters and to keep the program from acting as a barrier to participation, especially among older hunters.

Hunter-education requirements could reduce hunting participation and recruitment. If a person has to find out about the hunter-education course, enroll, attend regularly, and pass a hunting knowledge test, recruitment and participation may be more difficult. On the other hand, a hunter-education course could serve as a point of entry into hunting and possibly enhance participation. In the 1930s when about half of the U.S. population lived in the countryside, it was easy for a young person to take a gun, go out the back door and become a hunter. Today with nearly 80% of the population living in metropolitan areas, it isn't so easy. The young person who dreams about hunting may have little opportunity to become a hunter. This is particularly true if he/she lives in a city and does not have a father or relative who hunts. A hunter-education program could recruit participants who have no other way to become hunters.

To discover if hunter-education requirements are an impediment or an inducement, one might simply compare hunting participation and recruitment in states with and without a requirement. Such a comparison would be misleading. Recall, for example, that both New York and Wisconsin had hunter-education requirements in 1990. But in New York, all residents who were first-time hunters faced a requirement, while in

Wisconsin the requirement applied only to those under 18 years old. To test the effect of education requirements, individual data are needed to test whether the requirement applies to any particular person and whether the person hunted or not. This means we must know age, state of residence and hunting participation for individuals. The U.S. Fish and Wildlife Service surveys provide such individual-level data for 1980, 1985, and 1990.

The more serious problem is that the same social forces influence a state to adopt or not adopt a hunter-education program may also act to depress or maintain hunting participation. The negative effect of urbanization on hunter participation have been well established (Heberlein, 1987; Heberlein & Thomson, 1991, 1995). States with large proportions living in cities may also have been the most likely to adopt hunter-education requirements, because hunters are a less powerful force in opposing such restrictions on their recreational activities. If persons subject to hunter-education requirements have lower participation rates, it may simply be because they live in more urbanized states.

Another social force loosely described as "Hunting Culture" may have influenced states' adoption of hunter-education requirements and hunting rates. Hunting culture has been discussed by Stedman (1994) and Stedman, Decker and Stemer (1993). States with a larger proportion of hunters should have a more visible and influential hunting culture. In those states, hunting is seen as more legitimate and may be a powerful social force. People discuss hunting socially. Businesses and schools close during the opening of hunting seasons and symbols of hunting are more evident. When hunting is an important part of the culture, a state may be less likely to adopt hunter training requirements. Furthermore, where hunting culture is more dominant, it is more likely that people will be hunters and hunter recruitment will be enhanced. If individuals who are not subject to hunter-education requirements have higher participation rates, it may simply be because they live in states with a more dominant hunting culture.

An adequate analysis must therefore use individual level data must control for urbanization, hunting culture and other variables might be affecting both hunter-education requirements and hunting participation.

Methods

The basic data to explore the research question come from the National Surveys of Fishing, Hunting, and Wildlife-Associated Recreation conducted in 1981, 1986, and 1991 by the U.S. Fish and Wildlife Service (USFWS and Bureau of the Census, 1982, 1988, 1993). These surveys began with a telephone contact, called the screener survey, to determine whether household members had fished, hunted, or participated in wildlife-associated recreation during the previous year (1980, 1985,

respectively). Based on the reports of whoever answered the phone, records were created for every household member age five and older. Our analysis is based on persons age 12 and older in the survey year (11 and older during the reference year for hunting) because few states allow younger children to hunt alone, and several states exempt younger children from hunter education when they hunt with a licensed adult hunter. Our sample has 254,638 persons in 1981, 225,152 in 1986, and 214,937 in 1991.

The key dependent variables, whether the person hunted in the year prior to the survey, and whether he or she hunted for the first time that year, came from the screener surveys². Hunter participation rates and the probability of being a first-time hunter for each year are listed by state in Table 1. Six independent variables were included in our analysis. The first, presence or absence of a hunter-education requirement for the person, was calculated from the person's age reported on the survey and the state's requirements³. When the state requirement was based on age or birthdate, we coded each person as subject to the requirement only if they could not have attained the minimum exception age by the end of the reference year for hunting. Table 2 shows the proportion of persons age 11 and older who were coded as subject to hunter-education requirements in each state for each hunting year. Three other independent variables, age, gender and race/ethnicity, were also taken from screener survey reports. Past research has shown that these are related to hunting participation⁴.

Table 1
State Estimates, Hunter Participation and Recruitment,
1980-1990, Reports from Screener Surveys

| State | Percent Hunted | | Percent Hunted First Time | |
|-------------|----------------|-------|---------------------------|----------------|
| | 1980 | 1985 | 1990 | 1990 |
| All States | 9.87 | 9.09 | 8.98 | 0.76 0.67 0.54 |
| Alabama | 14.79 | 11.97 | 11.25 | 1.01 0.96 0.80 |
| Alaska | 21.30 | 19.50 | 21.46 | 1.94 1.27 1.10 |
| Arizona | 9.51 | 8.93 | 6.70 | 1.12 0.88 0.46 |
| Arkansas | 22.07 | 19.86 | 19.72 | 1.32 0.81 0.93 |
| California | 4.09 | 3.26 | 3.28 | 0.33 0.25 0.18 |
| Colorado | 11.57 | 10.28 | 9.69 | 1.04 0.69 0.79 |
| Connecticut | 3.50 | 2.87 | 3.38 | 0.35 0.28 0.20 |
| Delaware | 7.07 | 5.68 | 5.96 | 0.78 0.64 0.35 |
| Florida | 5.05 | 4.03 | 4.84 | 0.55 0.33 0.31 |
| Georgia | 11.34 | 10.59 | 8.69 | 1.32 0.75 0.50 |
| Hawaii | 2.83 | 2.19 | 2.77 | 0.40 0.41 0.07 |
| Idaho | 25.77 | 21.61 | 23.67 | 1.95 1.09 1.78 |
| Illinois | 5.10 | 4.73 | 5.24 | 0.41 0.40 0.35 |
| Indiana | 9.25 | 8.66 | 9.53 | 0.77 0.90 0.64 |

(cont.)

Table 1 (cont.)

| State | Percent Hunted | | Percent Hunted First Time | |
|----------------|----------------|-------|---------------------------|----------------|
| | 1980 | 1985 | 1990 | 1980 1985 1990 |
| All States | 9.87 | 9.09 | 8.98 | 0.76 0.67 0. |
| Iowa | 16.51 | 12.56 | 14.39 | 1.29 0.91 1. |
| Kansas | 13.51 | 12.60 | 12.33 | 0.83 0.76 0. |
| Kentucky | 12.14 | 12.10 | 14.26 | 0.80 0.97 0. |
| Louisiana | 15.96 | 15.65 | 13.29 | 0.97 0.79 0. |
| Maine | 21.98 | 16.72 | 14.78 | 1.65 1.21 0. |
| Maryland | 5.99 | 5.34 | 4.98 | 0.33 0.32 0. |
| Massachusetts | 2.88 | 2.97 | 2.73 | 0.37 0.26 0. |
| Michigan | 13.31 | 12.66 | 13.96 | 0.91 0.89 1. |
| Minnesota | 17.06 | 17.15 | 15.14 | 1.42 1.12 0. |
| Mississippi | 20.94 | 19.97 | 19.22 | 1.24 1.24 0. |
| Missouri | 12.90 | 15.23 | 13.84 | 1.06 0.89 0. |
| Montana | 25.50 | 24.98 | 27.98 | 2.26 1.83 1. |
| Nebraska | 16.10 | 14.01 | 13.54 | 1.48 0.86 0. |
| Nevada | 10.51 | 8.38 | 8.39 | 1.02 0.82 0. |
| New Hampshire | 9.48 | 9.45 | 8.38 | 0.56 0.50 0. |
| New Jersey | 3.43 | 3.02 | 3.23 | 0.20 0.21 0. |
| New Mexico | 11.43 | 11.69 | 11.71 | 1.42 1.14 0. |
| New York | 5.27 | 4.97 | 5.85 | 0.42 0.40 0. |
| North Carolina | 9.35 | 8.94 | 9.30 | 0.68 0.55 0. |
| North Dakota | 19.28 | 21.39 | 10.62 | 1.37 1.38 1. |
| Ohio | 7.55 | 6.96 | 7.69 | 0.37 0.50 0. |
| Oklahoma | 14.88 | 12.83 | 11.41 | 1.25 1.12 0. |
| Oregon | 15.63 | 14.46 | 13.86 | 0.94 1.01 1. |
| Pennsylvania | 12.13 | 11.56 | 10.45 | 0.94 0.80 0. |
| Rhode Island | 2.26 | 2.58 | 3.02 | 0.28 0.35 0. |
| South Carolina | 9.57 | 9.13 | 8.42 | 0.65 0.69 0. |
| South Dakota | 24.10 | 22.02 | 21.36 | 1.94 1.72 0. |
| Tennessee | 13.72 | 10.21 | 12.03 | 0.87 0.88 0. |
| Texas | 11.97 | 11.89 | 10.89 | 1.07 1.01 0. |
| Utah | 19.67 | 19.42 | 16.83 | 1.42 1.46 1. |
| Vermont | 23.99 | 21.59 | 18.53 | 1.63 1.17 1. |
| Virginia | 11.68 | 11.21 | 8.36 | 0.93 0.79 0. |
| Washington | 11.10 | 8.06 | 9.69 | 0.84 0.64 0. |
| West Virginia | 19.98 | 19.53 | 21.53 | 1.20 1.35 1. |
| Wisconsin | 17.40 | 17.25 | 19.37 | 1.06 1.25 1. |
| Wyoming | 29.75 | 27.87 | 25.40 | 2.06 2.12 1. |

Source: U.S. National Surveys of Fishing, Hunting and Wildlife-Associated Recreation.

Note: Weighted estimates based on screener survey; persons 12 years and older at time of interview (N=254,638 in 1981; 225,152 in 1986; 214,937 in 1991).

In spite of the importance of rural and urban residence to hunting, national survey changed the operational definition of each household or urban residence from year to year, and for some years the indicato

missing data for a large proportion of nonresidents. Consequently, we had to use state-level estimates of urbanization. Each individual was assigned a value for the percent rural in his or her state, based on the 1980 and 1990 U.S. Census figures.⁶ The most rural state in 1980 was Vermont with 66.2% rural, and the most urban was California with 8.7% rural.

Table 2
Hunter Education Requirements by State

| State | Year Adopted | Ages or First Cohort | Percent Age 11+ Included 1980 | 1985 | 1990 |
|-------------------|--------------|----------------------|-------------------------------|-------|-------|
| All States | 1949-1995 | | 44.1 | 44.9 | 50.7 |
| Adopted by 1960 | | | | | |
| Arizona | 1955 | 10-14 yrs | 87.1 | 86.9 | 86.5 |
| California | 1954 | all ages | 6.0 | 5.0 | 5.5 |
| Connecticut | 1957 | all ages | 100.0 | 100.0 | 100.0 |
| New Jersey | 1955 | all ages | 100.0 | 100.0 | 100.0 |
| New York | 1949 | all ages | 100.0 | 100.0 | 100.0 |
| Rhode Island | 1956 | all ages | 100.0 | 100.0 | 100.0 |
| South Dakota | 1956 | under 16 yrs | 8.3 | 7.7 | 6.8 |
| Utah | 1960 | 1966 | 6.6 | 17.9 | 29.9 |
| Washington | 1957 | under 18 yrs | 15.6 | 13.0 | 10.6 |
| Adopted 1961-70 | | | | | |
| Colorado | 1970 | 1949 | 76.6 | 77.4 | 77.4 |
| Delaware | 1967 | 1967 | 46.2 | 51.8 | 57.5 |
| New Hampshire | 1963 | all ages | 4.0 | 13.2 | 18.8 |
| Oregon | 1962 | under 18 yrs | 100.0 | 100.0 | 100.0 |
| Pennsylvania | 1969 | all ages | 12.4 | 12.0 | 9.7 |
| | | | 100.0 | 100.0 | 100.0 |
| Adopted 1971-1980 | | | | | |
| Georgia | 1978 | 1961 | 61.6 | 63.5 | 66.3 |
| Idaho | 1980 | 1975 | 18.3 | 24.2 | 31.8 |
| Illinois | 1976 | all ages | 0.0 | 0.0 | 8.5 |
| Kansas | 1973 | 1957 | 100.0 | 100.0 | 100.0 |
| Mainland | 1977 | all ages | 23.4 | 30.3 | 36.9 |
| Michigan | 1977 | all ages | 100.0 | 100.0 | 100.0 |
| Montana | 1971 | 1960 | 20.9 | 28.1 | 35.3 |
| Nebraska | 1977 | ages 12-17 | 12.6 | 11.2 | 12.2 |
| Nevada | 1976 | ages 12-15 | 8.0 | 7.1 | 6.3 |
| New Mexico | 1973 | 1960 | 17.8 | 25.1 | 33.4 |
| North Dakota | 1976 | under 18 yrs | 14.0 | 12.1 | 11.4 |
| Ohio | 1979 | 1962 | 14.7 | 22.6 | 29.6 |
| Vermont | 1979 | all ages | 100.0 | 100.0 | 100.0 |
| Wyoming | 1975 | all ages | 100.0 | 100.0 | 100.0 |
| | 1979 | 1966 | 6.6 | 15.3 | 22.3 |
| Adopted 1981-85 | | | | | |
| Arkansas | 1985 | | 0.0 | 7.4 | 16.0 |
| Iowa | 1983 | 1969 | 0.0 | 10.6 | 18.8 |
| Louisiana | 1985 | 1967 | 0.0 | 12.9 | 18.9 |
| Mississippi | 1985 | 1969 | 0.0 | 7.8 | 17.9 |
| | | 1972 | 0.0 | 3.9 | 14.0 |

(cont.)

Table 2 (cont.)

| State | Year Adopted | Ages or First Cohort | Percent Age 11+ Included 1980 | 1985 | 1990 |
|---------------------|--------------|----------------------|-------------------------------|------|-------|
| Adopted 1981-85 | | | | | |
| Tennessee | 1985 | 1969 | 0.0 | 9.4 | 17.2 |
| Wisconsin | 1985 | 1973 | 0.0 | 2.0 | 11.1 |
| Adopted 1986-90 | | | | | |
| Maine | 1986 | all ages | 0.0 | 0.0 | 31.9 |
| Missouri | 1988 | 1967 | 0.0 | 0.0 | 100.0 |
| Oklahoma | 1988 | 1972 | 0.0 | 0.0 | 18.4 |
| Texas | 1988 | 1971 | 0.0 | 0.0 | 10.9 |
| Virginia | 1989 | all ages | 0.0 | 0.0 | 12.5 |
| West Virginia | 1990 | 1975 | 0.0 | 0.0 | 100.0 |
| | | | 0.0 | 0.0 | 7.8 |
| Adopted 1991-95 | | | | | |
| Alabama | 1993 | 1977 | 0.0 | 0.0 | 0.0 |
| Florida | 1991 | 1975 | 0.0 | 0.0 | 0.0 |
| Hawaii | 1991 | 1971 | 0.0 | 0.0 | 0.0 |
| Indiana | 1992 | 1987 | 0.0 | 0.0 | 0.0 |
| Kentucky | 1991 | 1975 | 0.0 | 0.0 | 0.0 |
| Minnesota | 1991 | 1979 | 0.0 | 0.0 | 0.0 |
| North Carolina | 1991 | all ages | 0.0 | 0.0 | 0.0 |
| South Carolina | 1995 | under 16 yrs | 0.0 | 0.0 | 0.0 |
| Not Adopted by 1995 | | | | | |
| Alaska | none | — | 0.0 | 0.0 | 0.0 |
| Massachusetts | none | — | 0.0 | 0.0 | 0.0 |

Source: U.S. National Surveys of Hunting, Fishing and Wildlife-Associated Recreation. Note: See Appendix Table 1. In 1995, Washington extended the requirement to all persons born in 1972 or later. Massachusetts adopted a requirement effective in 1995.

No direct measure of hunting culture is available on the screen survey. We therefore used hunting rates *before* hunter-education requirements were implemented as an indicator of hunting culture. High hunt rates should produce the customs and symbols comprising hunt culture, which in turn may influence hunting in later years. The earliest available estimate of state-level hunter participation is from the 19 national survey conducted by the U.S. Fish and Wildlife Service in 1959. The survey report, unfortunately, provided only regional estimates rather than state estimates and the original data by state are no longer available. As a measure of hunting culture each person was assigned the 1955 hunt participation rate for his/her region of residence in the survey year.⁷ Hunting culture variable ranged from a high of 17.6% in the Mountain region to a low of 6.5% in the Mid-Atlantic.

Both ordinary least-squares and logistic regression models were used to predict whether a person hunted and whether he or she was a first-time hunter. The analysis was performed separately for 1980, 1985, and 1990. Si-

all results were similar, we present here the results from the OLS regression models for all three survey years combined. Models control for overall trends in hunting by controlling for survey year.

Findings

In 1980, 27 states required hunter education for first-time hunters, 34 states by 1985, and 40 by 1990⁸. Eight states adopted some requirement after 1990 and Washington extended its requirement to all ages, beginning with persons born in 1972. In 1995, only two states, Alaska and Massachusetts, had no hunter-education requirement.

In the 23 states where there was no requirement in 1980, the hunter participation rate was 12.21%. The percentage of state residents age 11 and older who were first-time hunters was 0.93% (Table 3). There was no significant difference between the states with no requirement and some requirements. But in those states where every first-time hunter was required to take a course, the participation rate was 6.04%, less than half the rate in the other two categories. The percentage of first-time hunters was also less than half of the other rates. But there were significant differences in the control variables as well. States that required mandatory education programs for all hunters in 1980 were much less rural and were in regions where earlier (1955) hunting participation was lower.

Table 4 presents the regression analysis where data from all three years are included, controlling for survey year, states' rural population and regional hunting in 1955, along with the person's age, sex, and race/ethnicity. The first model controls only for age and survey year⁹. If the hunter-education requirement applies to a person, the probability that he or she hunts is .064, but if he or she has no requirement, the probability is .119. The probability of a person being a first-time hunter also drops from .008 to .005 if he/she is required to take an education course. These differences are statistically significant at the .01 level.

When urbanization and regional hunting are included as controls in Model 1, the difference in hunting participation between those with and without an education requirement drops dramatically from over five percentage points in model 1 to less than 1 percentage point in Model 2, although it is still statistically significant¹⁰. For first-time hunters, however, the effect of being required to participate in a hunter-education course vanishes. The chances of being a first-time hunter are virtually identical for those required and not required to take a hunter-education course. Model 3 adds controls for sex and race/ethnicity but the differences in hunting participation and recruitment remain about the same as in Model 2.

Table 3
Hunting Participation, Rural Residence, and Prior Region Hunting Participation, by States' Hunter Education in 1980

| Variable | Hunter Education Applies to Persons 11+ | | | All St. |
|---------------------------------|---|--------|---------|---------|
| | None | Some | All | |
| Percent Hunted, 1980 | 12.21 | 13.41 | 6.04** | 9.8 |
| Percent Hunted First Time, 1980 | 0.93 | 1.11 | 0.44** | 0.7 |
| Percent Rural in State, 1980 | 33.16 | 29.62 | 17.73** | 26.2 |
| Percent Hunted in Region, 1955 | 11.41 | 12.67 | 7.96** | 10.2 |
| Number of States | 23 | 16 | 11 | 5 |
| Number in Sample | 115,695 | 67,361 | 71,582 | 254,63 |

Sources: 1981 U.S. National Survey of Fishing, Hunting and Wildlife-Associated Recreation; U.S. Bureau of the Census, 1980 Census of Population, Vol. 1 Table 25; U.S. Fish and Wildlife Service, 1986 Survey of Fishing, Hunting & Wildlife-Associated Recreation, Table B-2.

Note: 1980 hunting data are weighted estimates from the screener survey persons 11 years and older in 1980. In the screener survey, the respondent (household resident age 16 or older) provided information for all household members. The number of persons in each sample is unweighted and does reflect the proportion of the population subject to hunter education requirements, since states with smaller populations have higher sampling in the NSFHWAR surveys.

**p < .01.

Table 5 reports the percent hunting and the percent of first hunters by age group controlling for states' rural population, regional hunting and individuals' sex and race/ethnicity. A hunter-education requirement significantly reduces the probability that a person is a first hunter for each age group by about one percentage point. But there is a significant interaction with age for first-time hunting. Among the 11- to 15-year olds, the percentage of new hunters is 2.67%. If a hunter-education course is required, the recruitment is 2.48%, but where it is required, the 2.77%, significantly higher. For those over the age of 16, a hunter-education requirement is associated with a significantly lower percentage of first-time hunters.

Table 4
Hunting Participation by Hunter Education, Unadjusted and Adjusted for Individual Characteristics, States' Rural Population and Regional Hunting in 1955

| Control Variables | <u>Hunter Education Required for Age</u> | | All Persons |
|---|--|--------|-------------|
| | No | Yes | |
| Model 1: Age group | | | |
| Survey year | | | |
| Percent Hunted | 11.93 | 6.35** | 9.34 |
| Percent Hunted First Time | 0.81 | 0.49** | 0.66 |
| Model 2: Age group | | | |
| Survey year, % Rural, % Hunted in region 1955 | | | |
| Percent Hunted | 9.68 | 8.95** | 9.34 |
| Percent Hunted First Time | 0.66 | 0.66 | 0.66 |
| Model 3: Age group, Survey year, % Rural, % Hunted in region 1955, Sex, Race/Ethnicity | | | |
| Percent Hunted | 9.81 | 8.80** | 9.34 |
| Percent Hunted First Time | 0.66 | 0.65 | 0.66 |

Sources: See Table 1. Also, U.S. Bureau of the Census, 1990 Census of Population and Housing, Population and Housing Unit Counts, Table 44 Note: See Table 1. The unweighted sample size for all three survey years is 694,727 persons.

**p < .01

Discussion and Conclusions

A hunter-education requirement for first-time hunters appears to reduce hunting participation in the United States, but the reality of this effect and its size are uncertain. Simple bivariate analysis suggests that a requirement cuts participation in half (12% to 6%). But when urbanization and hunting culture are controlled, this difference drops to less than 1%. What might happen if we had better measures of rural experience and hunting culture and other variables that might account for the adoption and the severity of a hunter-education requirement? We expect that if we had an individual measure of residence (i.e., whether the person lived in a rural area rather than simply in a rural state), and a measure of hunting culture which took into account the richness of the concept, the negative effect of education requirements could be reduced to zero or perhaps even be reversed.

Table 5
Hunting Participation by Hunter Education, Adjusted for Individual Characteristics and States' Rural Population and Regional Hunting in 1955, Separately by Age

| Age Group | <u>Hunter Education Required for Age</u> | | All Persc |
|-------------------------|--|---------|-----------|
| | No | Yes | |
| Age 11-15 | | | |
| Percent Hunted | 10.31 | 9.41** | 9.73 |
| Percent Hunted 1st Time | 2.48 | 2.77* | 2.67 |
| Age 16-19 | | | |
| Percent Hunted | 12.55 | 11.93* | 12.20 |
| Percent Hunted 1st Time | 1.52 | 1.22* | 1.35 |
| Age 20-24 | | | |
| Percent Hunted | 12.55 | 10.98** | 11.75 |
| Percent Hunted 1st Time | 0.96 | 0.82 | 0.85 |
| Age 25 & older | | | |
| Percent Hunted | 9.11 | 8.09** | 8.67 |
| Percent Hunted 1st Time | 0.35 | 0.24** | 0.36 |

Sources: See Table 2.

Note: See Table 2.

*p < .05; **p < .01

The potentially positive effects of hunter education were revealed the hunter recruitment variable. With only age and survey year controlling the hunter-education requirements significantly reduced the percentage first-time hunters in the state. Once urbanization and hunting culture controlled, there was no difference in percentage of first-time hunters. A detailed look at age effects shows that having a hunter-education program actually increases the probability that an 11- to 15-year-old was a first hunter in the survey year. These programs may help recruit and socialize the youngest participants into the sport. After age 15, perhaps the people have more recreation alternatives, a hunter-education requirement reduces the probability that a randomly sampled individual will be a time hunter.

These analyses apply to national participation rates only, not particular states or particular programs. It could well be that some states have designed programs that act as substantial barriers to hunting, while other states have designed programs that increase hunting participation. The effects of such programs can be assessed only by a careful look at trends and time series data in those states.

Many factors are associated with the decline in hunter participation in the United States. Hunter education may be among them, but its effect is still uncertain. Analysis of the national survey data suggests that a hunter-education requirement may be among them, but its effect is still uncertain.

requirement may reduce hunting participation by approximately 1%, but this inference should be accepted only tentatively because of the large swings when reasonable controls are invoked. There is some evidence that hunter education can, in the youngest age groups, increase recruitment. These findings should be explored further in studies of specific hunter-education programs.

End Notes

¹This research was supported by Responsive Management and the University of Wisconsin-Madison as part of a larger study by Responsive Management on the effects of mandatory hunter education.

²The 1990 data include a small number (0.8%) of cases without information on whether the person hunted that year. The 1980 and 1985 data files, however, do not allow us to distinguish persons for whom hunting was not reported from those who did not hunt. We therefore coded the cases without information in 1990 as non-hunters, in order to maintain comparability with the 1980 and 1985 data.

³These requirements were collected by Mark Duda and Kira Young from Responsive Management, Inc. who contacted each state and kindly provided us the data. We thank them for their assistance.

⁴In our 1995 analysis of the NSFHWAR surveys, we controlled for additional individual characteristics — completed education and occupation, marital status, household income, and the population size of the community in which the person lived at age 16. For the youngest age group in our analysis (11-15), the group most central to hunter education and recruitment, these variables are not defined, are constant, or are not as directly relevant to recreational behavior as for respondents age 16 and older. We therefore limited individual-level control variables to those meaningful for all age groups.

⁵The 1980 screener survey includes a census-based code for rural and urban, but no information is available for residents of Nevada, Wyoming, and Alaska. The same variable on the 1985 screener survey was not reported for 40% of households, including the entire sample for several states. No similar variable is available on the 1990 screener survey. The 1990 survey contains a variable, FARM, with three categories — rural-farm, rural-nonfarm, and urban. Unfortunately, no information is available in the interview or codebook to identify the source of this variable, nor whether it is comparable to the 1980 or 1985 variables. In 1985 and 1990, but not 1980, the household respondent reported whether he/she lived in an urban area, a small town, or a rural area. There is, of course a strong association between self-reports and the census codes in 1985, and between self-reports and the FARM variable in 1990, but there are considerable differences as well.

⁶In 1985 we use the average of the 1980 and 1990 values.

⁷Only New York and California began requiring hunter education before 1955.

⁸Idaho adopted its hunter-education requirement in 1980, but no persons age 11 and older were subject to the requirement in 1980 or 1985.

⁹The baseline model includes age because most of the existing hunter-education requirements vary by age, either applying only to a fixed (younger) age group or applying to persons born after a particular year. In addition, hunting participation varies considerably by age, and hunting recruitment occurs primarily in the younger ages. The estimated rates adjusted for year of hunt and for age are not, however, much different from unadjusted estimates.

difference in the odds of hunting than would be computed from the ordinary least-squares estimated percentages. Both analyses, however, showed a dramatic reduction in the estimated difference in hunting between those to whom the requirement did and did not apply when urbanization and regional hunting are controlled. Because of the complexity of presenting the log odds and because the analytic precision gained by logistic regression is small, especially compared to the reduction when appropriate controls are added to the model, we present only the results from the OLS regression analyses. Logistic regression parameters and test statistics are available from the authors.

References

- Heberlein, T. A. (1987). Stalking the predator: A profile of the American hunter. *Environment*, 29, 6-11, 30-33.
- Heberlein, T. A., & Thomson, E. (1991). Socio-economic influences on declining hunter numbers in the United States 1977-1990. In S. Csanyi & J. Ernhaft (Eds.), *Transactions of the 20th Congress of the International Union of Game Biologists, Part 2* (pp. 699-705). Gödölle, Hungary: University of Agricultural Sciences.
- Heberlein, T. A., & Thomson, E. (1995). Changes in U.S. hunting participation, 1980-1990. Paper presented at the XXII Congress, International Union of Game Biologists, Sofia, Bulgaria.
- Siedman, R. C. (1994). Urban and rural-based hunters: An exploration of the culture of hunting. Paper presented at the Fifth International Symposium on Society and Resource Management, Colorado State University, Fort Collins, Colorado.
- Siedman, R. C., Decker, D. J., & Siemer, W. F. (1993). Exploring the social world of hunting: Expanding the concepts of hunters and hunting. Human Dimensions Research Unit Series No. 93-7, Department of Natural Resources, Cornell University, Ithaca, NY.
- U.S. Bureau of the Census. (1981, 1986, 1991). *Current Population Reports*, Series P-20, March. Washington, D.C.: U.S. Government Printing Office.
- U.S. Department of Commerce & U.S. Bureau of the Census. (1993). *Statistical Abstract of the United States 1993*. Washington, D.C.: U.S. Government Printing Office.
- U.S. Fish and Wildlife Service & U.S. Bureau of the Census. (1982). *1980 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation*. Washington, D.C.: U.S. Government Printing Office.
- U.S. Fish and Wildlife Service & U.S. Bureau of the Census. (1988). *1985 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation*. Washington, D.C.: U.S. Government Printing Office.
- U.S. Fish and Wildlife Service & U.S. Bureau of the Census. (1993). *An Overview of Fishing, Hunting, and Wildlife-Associated Recreation*. Washington, D.C.: U.S. Government Printing Office.